

Секція 7
КОМП'ЮТЕРНО-ІНТЕГРОВАНІ ТЕХНОЛОГІЇ ТА
РОБОТОТЕХНІКА

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Artem Prykhodko, student
Sumy State University

AUTOMATION OF WASTEWATER TREATMENT
PROCESSES USING DIGITAL TECHNOLOGIES

In modern conditions of increasing anthropogenic load on the environment, increasing the efficiency of wastewater treatment is of particular relevance. Traditional treatment methods are often characterized by significant energy consumption, lack of flexibility and dependence on the human factor. In this regard, the introduction of automated control systems based on digital technologies is a promising direction for improving the operation of treatment facilities.

Automation of wastewater treatment processes involves the use of sensors, controllers and software for continuous monitoring and control of technological parameters. Key indicators include the level of pollution, concentration of suspended solids, chemical oxygen demand, pH of the environment, temperature and others. The use of sensor systems allows you to receive data in real time, which significantly increases the accuracy of control and the speed of decision-making [1].

An important role is played by computer-integrated control systems that provide automatic regulation of the operation of pumps, aeration units, filters and other elements of the technological process. This allows you to optimize energy consumption, reduce resource losses and improve the quality of treatment. In addition, the use of optimization algorithms and artificial intelligence elements makes it possible to predict changes in the composition of wastewater and adjust equipment operating modes in advance [2].

One of the promising areas is the integration of Internet of Things (IoT) technologies, which provides remote monitoring and control of treatment systems. This is especially relevant for distributed facilities and small treatment plants. The use of cloud services allows you to accumulate and analyze large amounts of data, which helps to increase management efficiency [3].

Thus, automation of wastewater treatment processes using digital technologies helps to increase environmental safety, reduce energy consumption and improve the quality of treatment. Further development of this area is associated with the implementation of intelligent management

systems that ensure sustainable development of the water management complex.

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